

exchanger of the constant volume sampler (if used) and the heated components of any continuous sampling system(s) (if applicable) shall be preheated to their designated operating temperatures before the test begins. See § 86.1340(e) for continuous sampling procedures.

(19) Adjust the sample flow rates to the desired flow rate and set the CVS gas flow measuring devices to zero.

(20) For diesel engines tested for particulate, carefully install a clean, loaded particulate sample filter cartridge in the filter holder assembly and install the filter holder assembly in the sample flow line.

(21) Follow the manufacturer's choke and throttle instruction for hot starting. Simultaneously start the engine and begin exhaust and dilution air sampling. For diesel engines, turn on the hydrocarbon and NO_x (and CO and CO₂, if continuous) analyzer system integrator (if used), indicate the start of the test on the data collection medium, and turn on the particulate sample pump(s).

(22) [Reserved]

(23) Allow the engine to idle freely with no-load for 24±1 seconds. The provisions and interpretations of paragraph (a)(9) of this section apply.

(24) Begin the transient-engine cycle such that the first non-idle record of the cycle occurs at 25±1 seconds. The free idle is included in the 25±1 seconds.

(25) On the last record of the cycle, allow sampling system response times to elapse and cease sampling. Turn off the particulate sample pump(s) (if appropriate), the gas flow measuring device(s) and any continuous analyzer system integrator and indicate the end of the test on the data collection medium.

(26) As soon as possible, transfer the "hot start cycle" exhaust and dilution air bag samples to the analytical system and process the samples according to § 86.1340. A stabilized reading of the exhaust sample on all analyzers shall be obtained within 20 minutes of the end of the sample collection phase of the test. Analyze the methanol and formaldehyde samples within 24 hours. (If it is not possible to perform analysis within 24 hours, the samples should be stored in a cold (approximately 0

deg.C) dark environment until analysis can be performed). For particulate measurements, carefully remove the filter holder assembly. It is recommended that the filter cartridge be transferred to and from the filter stabilization environment within the filter holder assembly with both ends plugged, and that the cartridge be removed from the filter holder assembly within the stabilization environment. Transfer the particulate filter to the stabilization environment for post-test stabilization. Filters may be stabilized in the petri dishes while still within the filter cartridges, or the cartridge tops may be removed for stabilization, or the filters may be entirely removed from the filter cartridges and stabilized in the petri dishes alone. Removal of the filters from the filter cartridges shall only take place within the stabilization environment.

(27) The CVS and the engine may be turned off, if desired.

(b) The procedure in paragraph (a) of this section is designed for one sample bag for the cold start portion and one for the hot start portion.

(c) If a dynamometer test run is determined to be void, corrective action may be taken. The engine may then be allowed to cool (naturally or forced) and the dynamometer test rerun.

[66 FR 5186, Jan. 18, 2001]

§ 86.1338-84 Emission measurement accuracy.

(a) *Measurement accuracy—Bag sampling.* (1) Good engineering practice dictates that exhaust emission sample analyzer readings below 15 percent of full scale chart deflection should generally not be used.

(2) Some high resolution read-out systems such as computers, data loggers, etc., can provide sufficient accuracy and resolution below 15 percent of full scale. Such systems may be used provided that additional calibrations of at least 4 non-zero nominally equally spaced points, using good engineering judgement, below 15 percent of full scale are made to ensure the accuracy of the calibration curves.

(3) The following procedure shall be followed:

(i) Span the analyzer using a calibration gas that meets the accuracy requirements of § 86.1314–84(f)(2), is within the operating range of the analyzer and at least 90% of full scale.

(ii) Generate calibration data over the full concentration range at a minimum of 6, approximately equally spaced, points (e.g. 15, 30, 45, 60, 75 and 90 percent of the range of concentrations provided by the gas divider). If a gas divider or blender is being used to calibrate the analyzer and the requirements of paragraph (a)(2) of this section are met, verify that a second calibration gas with a concentration between 10 and 20 percent of full scale can be named within 2 percent of its certified concentration. If more calibration points are needed to meet the requirements of paragraph (a)(2) of this section, continue with paragraph (a)(3)(iii) of this section.

(iii) If a gas divider or blender is being used to calibrate the analyzer, input the value of a second calibration gas (a span gas may be used for calibrating a CO₂ analyzer) having a named concentration between 10 and 20 percent of full scale. This gas shall be included on the calibration curve. Continue adding calibration points by dividing this gas until the requirements of paragraph (a)(2) of this section are met.

(iv) Fit a calibration curve per §§ 86.1321 through 86.1324 for the full scale range of the analyzer using the calibration data obtained with both calibration gases.

(b) *Measurement accuracy—Continuous sampling.* (1) Analyzers used for continuous analysis must be operated such that the measured concentration falls between 15 and 100 percent of full scale chart deflection. Exceptions to these limits are:

(i) Analyzer response less than 15 percent or more than 100 percent of full scale may be used if automatic range change circuitry is used and the limits for range changes are between 15 and 100 percent of full scale chart deflection;

(ii) Analyzer response less than 15 percent of full scale may be used if one of the following is true:

(A) Alternative (a)(2) of this section is used to ensure that the accuracy of

the calibration curve is maintained below 15 percent; or

(B) The full scale value of the range is 155 ppm (C) or less.

(iii) Analyzer response over 100% of full scale may be used if it can be shown that readings in this range are accurate.

(iv) The HC and CO readings are allowed to “spike” above full scale of the analyzer’s maximum operating range for a maximum accumulation of 5 seconds. These analyzer readings shall default to the maximum readable value during this time.

(c) If a gas divider is used, the gas divider shall conform to the accuracy requirements specified in § 86.1314–84(g), and shall be used according to the procedures contained in (a) and (b) of this section.

[62 FR 47133, Sept. 5, 1997]

§ 86.1338–2007 Emission measurement accuracy.

(a) *Minimum limit.* (1) The minimum limit of an analyzer must be equal to or less than one-half of the average diluted concentration for an engine emitting the maximum amount of the applicable pollutant allowed by the applicable standard. For example, if with a given dilution and sampling system, an engine emitting NO_x at the level of the standard (e.g., 0.20 g/bhp-hr NO_x) would result in an average NO_x concentration of 1.0 ppm in the diluted sample, then the minimum limit for the NO_x analyzer must be less than or equal to 0.5 ppm.

(2) For the purpose of this section, “minimum limit” means the lowest of the following levels:

(i) The lowest NO_x concentration in the calibration curve for which an accuracy of ±2 percent of point has been demonstrated as specified in paragraph (a)(3) of this section; or

(ii) Any NO_x concentration for which the test facility has demonstrated sufficient accuracy to the Administrator’s satisfaction prior to the start of testing, such that it will allow a meaningful determination of compliance with respect to the applicable standard.

(3) For determination of the analyzer’s minimum limit, a NO_x concentration that is less than or equal to